AN ROINN OIDEACHAIS.

(Department of Education).

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INTERMEDIATE CERTIFICATE EXAMINATION, 1944.

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SCIENCE (Syllabus A)

TUESDAY, 20*th JUNE.*—MORNING, 10 TO 12.

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[Not more than *six* questions to be attempted, of which *three* must be taken from Section I, and *three* from Section II. Illustrate your answers wherever possible. All questions are of equal value.]

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SECTION I.

1. Describe fully an experiment to compare the weight of a floating object with the weight of liquid (other than water) which it displaces. What result would you expect?

A wooden block of uniform cross-section and of height 12 inches, sinks to a depth of 8 inches in water and 10·2 inches in spirits. Calculate the density of (*a*) wood, (*b*) spirits.

2. What is meant by specific heat?

Describe carefully how you would determine the specific heat of a given metal.

3. What liquid and what type of tube would you use in the construction of a thermometer? Give reasons. Describe, with diagrams, how you would graduate a thermometer to measure temperatures on the Centigrade scale. If such a thermometer were put into a liquid at 10·3°F., what reading would it show?

4. Describe with the aid of a diagram how you would use a laboratory balance to weigh an object in water.

A piece of lead weighs 30·01 grms. in air and 27·38 grms. in water. What is its volume?

If this piece of lead were moulded into the shape of a hollow sphere weighing 26·45 grms. in water, what would be the volume of the hollow?

5. Describe fully how you would construct a simple mercury barometer. Explain how it measures the pressure of the atmosphere.

Draw a sketch of a simple siphon and explain how it works.

SECTION II.

6. Describe in detail a laboratory method for preparing a reasonably pure sample of nitric acid. Sketch the apparatus used and write down the properties of the acid. Name one of its salts and describe the action of heat on it.

7. Sketch the apparatus you would use and describe how you would use it to prepare and to pass dry hydrogen over heated copper oxide and to collect the product formed.

On passing dry hydrogen over 2·01 grms. of heated copper oxide until there was no further change in weight it was found that the weight had decreased by 0·41 grms. Calculate the equivalent wt. of copper.

8.   (a) A white substance when shaken up with water does not seem to dissolve; how would you find out if any of it had dissolved?

      (b) A solution of common salt in water is being evaporated; how would you find out when the salt was completely dry?

      (c) If you were given a mixture of sand and salt, how would you obtain the sand free from salt, and how would you prove that all the salt had been removed?

9. What do you understand by (a) centre of gravity, (b) moment of a force, (c) the principle of moments?

A uniform plank weighing 100 lbs. rests on two supports, one at each end; what is the pressure on each of the supports?

Explain briefly how the pressure on the supports changes as a man weighing 160 lbs. walks on the plank from one end to the other. What will be the pressure on one of the supports when he is at a distance of one-third the length of the plank from it?

10. Sketch and describe any system of pulleys.

Describe in detail how, using this system to raise a load, you would measure (a) the work done by the effort, and (b) the work done against gravity. How would you then calculate the work done in overcoming friction?